A slow neutron beats a flipping fast bit

March 23, 2018

A slow neutron beats a flipping fast bit

by Suzanne Nowicki and Nathan DeBardeleben

Once every minute and for no good reason, a bit flips in a supercomputer at Los Alamos National Laboratory, causing an error. All of a sudden, say, 1 + 1 = 3.

Bits are the basic currency of all digital information. They come in two flavors, zeroes and ones. As a computer does its work, bits are called from disk storage, zip through processors and park temporarily in memory. When a bit randomly jumps from 0 to 1, it might alter a calculation or hide a piece of information. Computer engineers call it a single-event upset or a fault.

These upsets are tripping computers of all sizes more frequently, not just at the lab, but in the broader computing world, too. For Los Alamos, with a dozen-plus supercomputers running jobs vital to national security and other important science missions, single-event upsets are a fact of life because of the density of components.

This story first appeared in Albuquerque Journal.